Control Equipment Limited

FIRECLASS

DUO-CEL

FIRE DETECTION/ALARM PANEL

Installation & Commissioning Manual

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1. Introduction

This document contains all the information necessary for the installation, commissioning and maintenance of the **FIRE**CLASS DUO-CEL panel and repeater.

Please read this manual fully before commencing installation.

The following supporting documentation is also available:

- **FIRE**CLASS DUO-CEL Sales Literature
- **FIRE**CLASS DUO-CEL Panel Application Guide
- **FIRE**CLASS DUO-CEL User Manual
- **FIRE**CLASS DUO-CEL Log Book

References are made throughout this document to "Fire Signal Output". This is an output used to send a common fire warning signal to a remote fire monitoring station. It should not be used for any other purpose.

1.1 Panel Identification

The DUO-CEL panel & Repeater type can be identified from the Part Number on the side of the enclosure (see section 13. for location details).
The table below shows the part numbers.

Panel/Repeater Type	Part Number
1 Zone Standard Panel	508.031.701
2 Zone Standard Panel	508.031.702
4 Zone Standard Panel	508.031.703
8 Zone Standard Panel	508.031.704
8 Zone Repeater – C/W PSE	508.031.705
8 Zone Repeater – No PSE	508.031.706
1 Zone Twin-Wire Panel	508.031.707
2 Zone Twin-Wire Panel	508.031.708
4 Zone Twin-Wire Panel	508.031.709
8 Zone Twin-Wire Panel	508.031.710

2. Panel Circuit Details

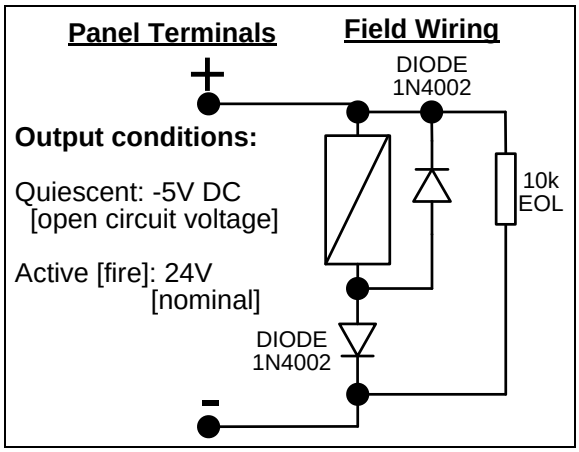
2.1 Auxiliary Supply

An auxiliary supply output is available to power the repeaters and other external field equipment from the panel. This voltage is nominally 27.15Vdc but varies during mains-failed conditions, depending on battery voltage.
The output is electronically fused and fuse activation will be indicated as Fuse Failed on the panel display. The fuse can be reset after removal of the fault by operating the Reset button on the display.
The auxiliary supply terminals are labelled **AUX 0.25A 24V and 0V**.
An additional **UNFUSED** 24V output is provided on repeaters for connection to additional DC powered repeaters.
Note: If equipment draws current from the auxiliary supply during the mains-failed condition this must be included in the battery capacity calculations.

2.2 Fire Signal Output

The Fire Signal output is fault-monitored in the non-energised condition. It is designed to operate a signalling relay at the routing equipment. The Relay coil must be polarised and suppressed, because the 10k end-of-line device is reverse-polarity monitored for open & short circuit faults. See Figure 1 for details.

Figure 1 – Fire Signal Output Connections



2.3 Fire Relay Output

The Fire Relay output is a single pole relay with volt-free change-over contacts. The relay is normally de-energised and energises for any fire alarm condition. The relay remains energised until panel reset. This relay will not energise if zone 1 is configured as non-latching and only zone 1 is in alarm. See Figure 2 for details.

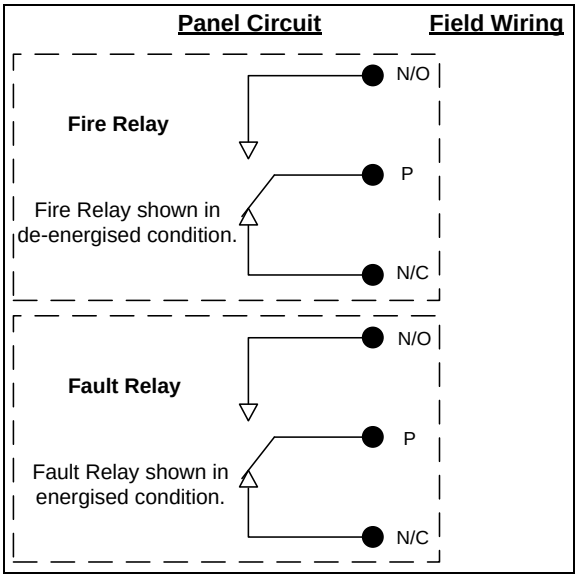
2.4 Fault Relay Output

The Fault Relay output is a single pole relay with volt-free change-over contacts. The relay is fail-safe and is therefore normally energised, de-energising for any faults. The marking on the control board terminals is for the energised condition. See Figure 2 for details.

NOTE:

The volt-free relay contacts are rated at 30Vdc with a maximum current of 1A. Do not exceed the rated voltage and current.

Figure 2 – Relay contact connection details



2.5 Remote Control Input

A single 2-terminal input allows remote operation of the following functions:

Control Level	Function	Control Resistor
1	Class Change	4k7
2	Alert	2k2
3	Evacuate	1k
4	Remote Silence Alarms	470R
5	Remote Reset	220R

Control Level 1 is lowest priority, 5 is highest priority.
The input is monitored for open and short circuit faults. Each control level requires a different resistor load as shown in the above table. A 10K resistor acts as the end-of-line device for fault monitoring. See Figure 3 for wiring details.

2.5.1 Class Change

The Class Change function allows all sounder circuits to be operated for a maximum of 5 seconds.

When the Class Change resistor is applied, the sounders will operate continuously and then automatically silence after 5 seconds. No indications will be given on the panel. The resistor needs to be removed and applied again if the signal needs to be repeated.

2.5.2 Alert

The Alert function allows all sounder circuits to be operated in pulsing mode.

When the Alert resistor is applied, the sounders will pulse until the resistor is removed. The Alert/Evac On LED will illuminate on the panel and the internal buzzer will sound.

2.5.3 Evacuate

The Evacuate function allows all sounder circuits to be operated in continuous mode.

When the Evacuate resistor is applied, the sounders will operate continuously until the resistor is removed. The Alert/Evac On LED will illuminate on the panel and the internal buzzer will sound. The Evacuate output will also operate.

2.5.4 Silence Alarms

The Silence Alarms function allows all active sounder circuits to be deactivated.

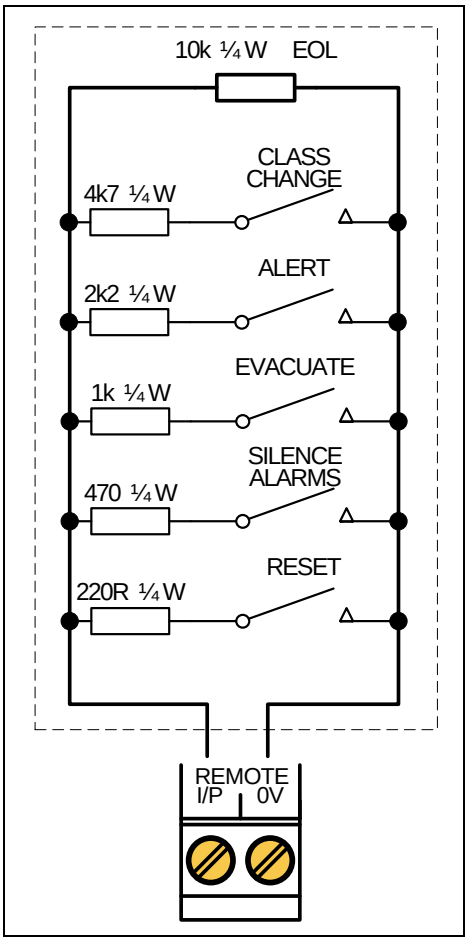
When the Silence Alarms resistor is applied, any active sounder circuits will be deactivated. The Silence Alarms function is momentary and the resistor needs to be removed and applied again in order to re-operate the Silence Alarms function.

2.5.5 Reset

The Reset function allows all standing alarms and faults to be cleared, returning the panel to the quiescent state. The Auxiliary 24VDC supply may also be switched off for 10 seconds if configured to do so.

When the Reset resistor is applied with the panel in the alarm condition, any active sounder circuits will be deactivated, all zone circuits will reset the detectors, the fire relay will de-energise, the fault relay will deactivate and all fire and fault indications will clear. The Reset function is momentary and the resistor needs to be removed and applied again in order to re-operate the Reset function.

Figure 3 – Remote Control I/P connections



Note:
To prevent unauthorised operation of the system, any manually operated function must be operated by a key-switch. The key to the switch should be held with the panel's access control key.
For the SILENCE ALARMS and RESET functions, the Keyswitch should be spring-biased so that it automatically returns to the off position when released.

2.6 Open Collector Outputs

Three open collector outputs are provided:

1. Disabled (DIS.)
2. Evacuate (EVAC.)
3. Buzzer Active (BUZ.)

They are referred to as 'open collector' because each output is connected to the open collector pin of a transistor.

In the deactivated state, each open collector output is floating and is effectively open circuit. When the output is activated, the transistor allows current to flow from the open collector pin down to 0V. Each output is able to sink 50mA when active. Higher currents will damage the transistor driver.

If the output is used to drive a relay then a suppression diode should be used across the relay coil to avoid damaging the output driver circuit.

2.6.1 Disabled Output

The Disabled output is activated when any disablements exist on the panel. The only exceptions are Buzzer Disable and Earth Fault Disable, both of which produce no indications on the panel.

2.6.2 Evacuate Output

The Evacuate output is activated when the panel is in the Evacuate state, either due to the button on the display or due to the Remote Control input.

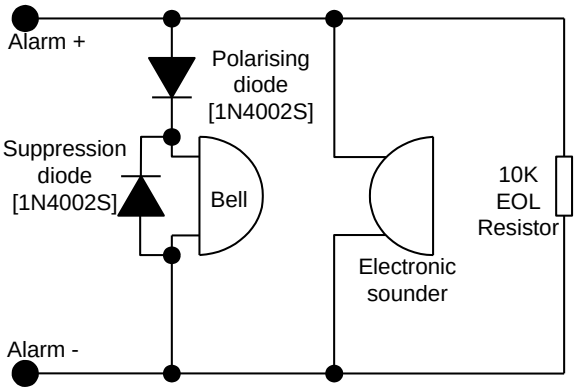
2.6.3 Buzzer Active Output

The Buzzer Active output duplicates the panel buzzer for alarm and fault conditions. It does not operate for button presses.

2.7 Sounder Circuits

The panel has up to 4 standard sounder circuits, each rated at 0.5 Amps (not including twin-wire sounders). The circuits are reverse polarity monitored for open and short circuit faults. All connected field devices must be polarised to allow correct fault monitoring. To prevent damage to the control panel, any solenoid devices such as bells must also have a suppression diode fitted as shown in Figure 4.
The circuit must be terminated with a 10K end of line resistor.

Figure 4 – Alarm circuit configuration



2.8 Electrical Design of Detection Zones

To allow the panel to correctly monitor for fault conditions, the wiring for each zone must be installed as a continuous pair with no spurs or tees. The end-of-line monitoring device will depend on the zone configuration of the panel. Correct polarity must be strictly observed throughout.

2.8.1 Standard Panel Default Zone Configuration

The Default Zone Configuration (factory Default) on the standard panel uses active fault monitoring, with a 10uF capacitor as the EOL device. This allows the maximum number of detectors to be used (up to 32 per zone) and maintains line

continuity (via diodes fitted to detector bases) when a detector head is removed.

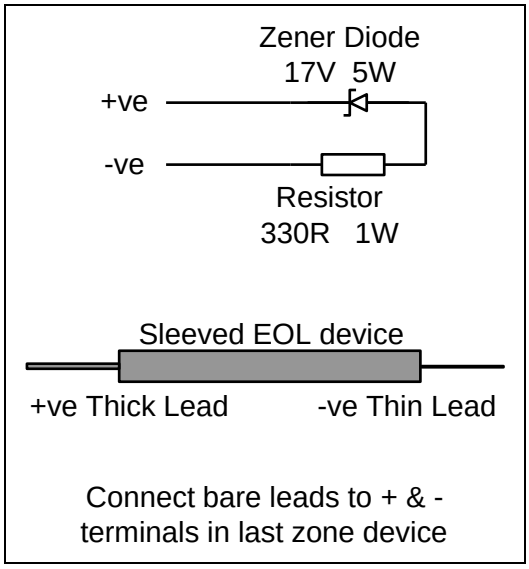
2.8.2 Standard Panel Resistor Zone Configuration

The Resistor Zone Configuration on the standard panel can be selected by DIL switch and uses passive fault monitoring, with a 6K8 to 3K9 resistor as the EOL device. The number of detectors is restricted by the total current drawn by the detectors, which must not exceed 1.6mA. Line continuity cannot be maintained when a detector head is removed.

2.8.3 Twin-Wire Panel Zone Configuration

The Twin-Wire panel uses passive fault monitoring but with an EOL device consisting of a zener diode and resistor as shown in Figure 5. The device is polarised and should not be connected in reverse (otherwise the panel will indicate an alarm condition). This EOL device allows monitoring for detector head removal whilst maintaining line continuity via diodes fitted to detector bases.
Only use detector bases with 1N4002 line continuity diodes fitted.
DO NOT leave any diode bases empty. Detectors should be fitted or a blanking plate which links out the diode should be fitted.
NOTE: The twin-wire EOL will draw up to 4mA from the zone in quiescent and this should therefore be added to the total zone current when calculating the standby battery requirements.

Figure 5 – Twin-Wire EOL device



2.8.4 Maximum Number of Devices on a Zone

For the standard panel with 10uF EOL capacitor, the maximum number of detectors & MCPs per zone is limited to 32 or less (see DUO-CEL Application Guide).

For the standard panel with EOL resistor, the maximum number of devices allowed on a zone is limited by the quiescent current drawn by each device. The quiescent current will be listed on the device data sheet provided by the Manufacturer of the device.

The maximum quiescent current available to power devices on a zone is 1.6mA. Exceeding this value will prevent the panel from correctly monitoring for open circuit fault conditions.

For the Twin-Wire panel the maximum number of detectors & MCPs per zone is limited to 16 (or less, see DUO-CEL Application Guide) if sounders are also connected. If no twin-wire sounders are on the zone then up to 30 detectors & MCPs may be connected (see DUO-CEL Application Guide for details). The maximum number of twin-wire sounders permitted is 12 (or less; see DUO-CEL Application Guide).

Note: It is a recommendation of BSEN 54-2 that there should be no more than 32 detectors & MCPs in a zone.

Figure 6 – Standard Zone Wiring Diagram

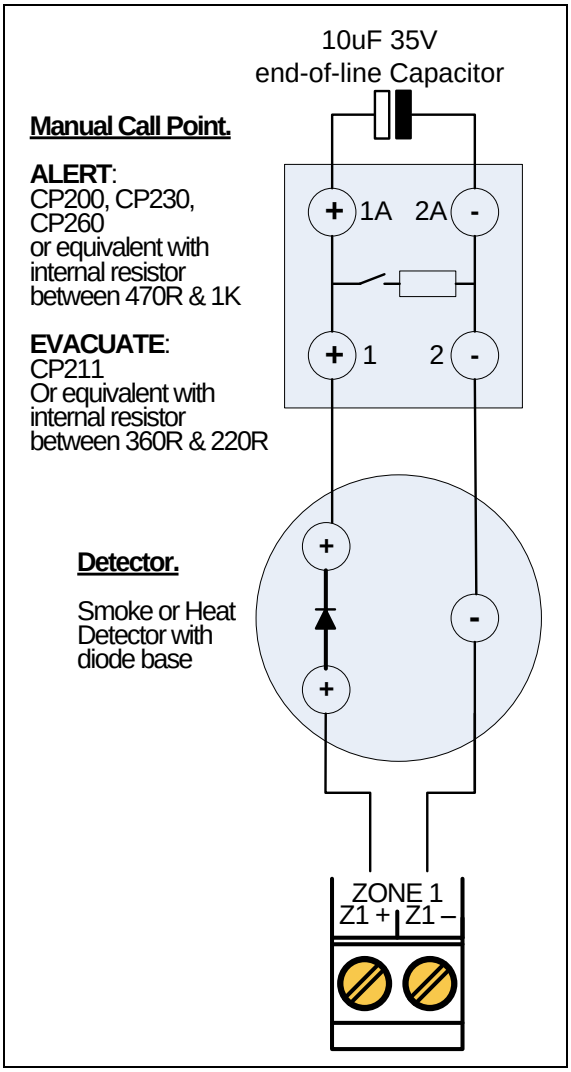


Figure 7 – Resistor EOL Zone Wiring Diagram

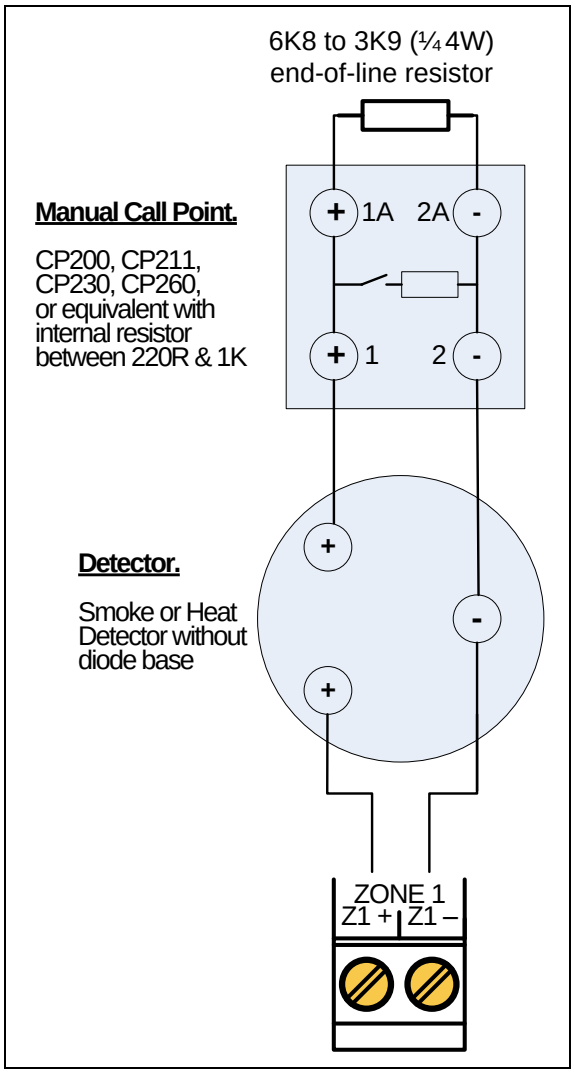


Figure 8 – Twin-Wire Zone Wiring Diagram

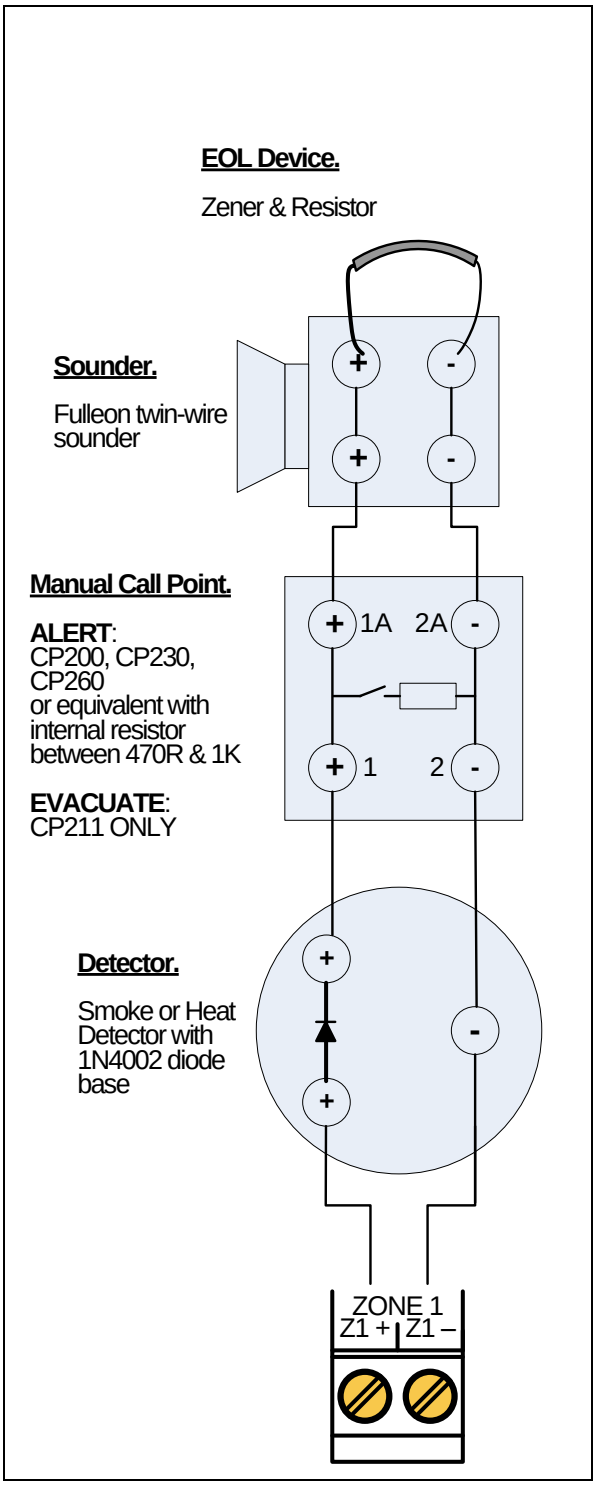
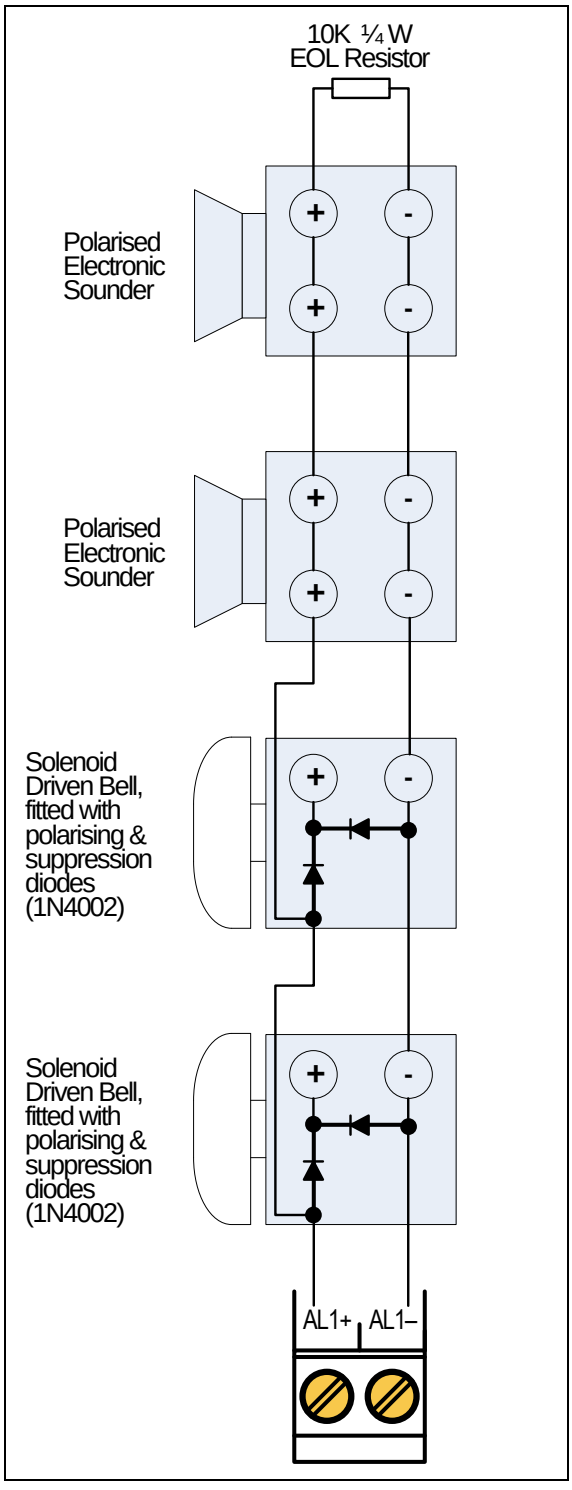
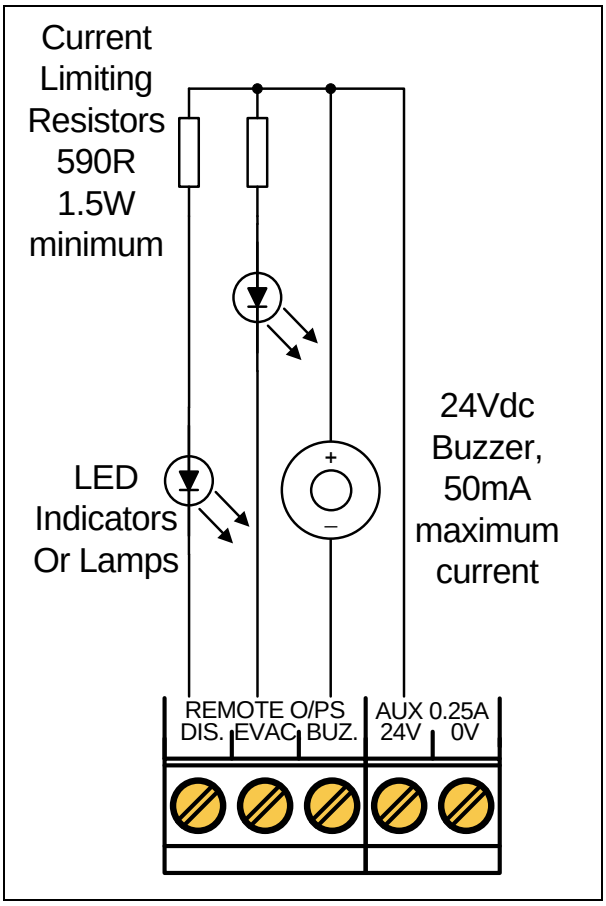


Figure 9 – Alarm Circuit Wiring Diagram



NOTE: The Alarm circuit terminals are marked for the active polarity. When in quiescent monitoring mode, the alarm circuit is monitored in the reverse polarity (hence the requirement for a polarising diode).

Figure 10 – Remote Indicators Wiring Diagram



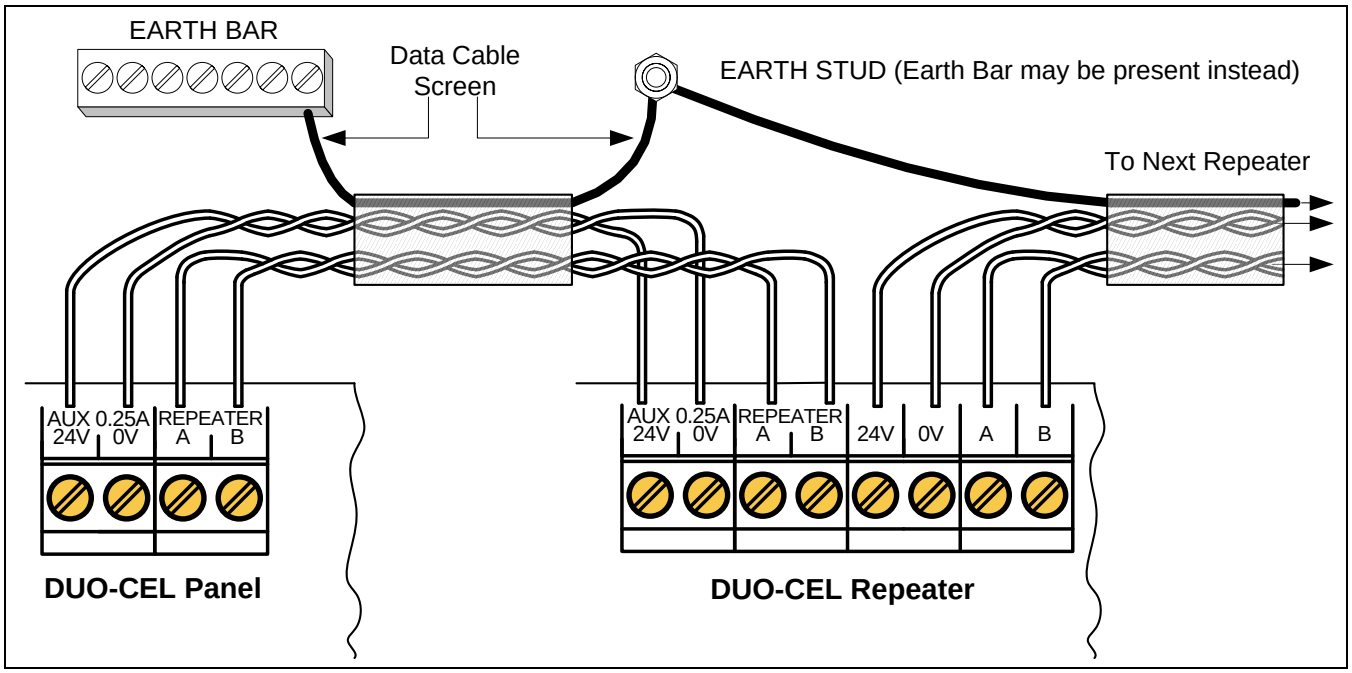
2.9 Panel to Repeater Wiring

The Repeater RS485 communication and 24Vdc power connections should all be made via a single multi-core data cable. The number of cores required is two if the repeater is mains powered, or four if powered from the panel. A cable screen is not required but is usually present in most data cable types. The A & B lines should be connected via one set of twisted pair cores, the 24V & 0V lines should be connected via another set of twisted pair cores.

If the cable includes a screen then this should be earthed at the panel & all repeaters.

Terminal A at the panel must be connected to Terminal A at all repeaters, Terminal B at the panel must be connected to Terminal B at all repeaters.

Figure 11 – Repeater Wiring Diagram



3. Installation and Commissioning Procedure Overview

This section lists the steps that are taken in installing and commissioning a DUO-CEL system. Reference should be made to the DUO-CEL Application manual for technical details and description of panel features.

1. **Install all field wiring and equipment**
   - Refer to the Installation Guidelines in section 4.2 below
   - Refer to the field device installation manuals
2. **Install the panel**
   - Refer to the installation instructions in section 4.2 below
   - Do not connect the field equipment at this stage.
3. **Connect any repeaters (if applicable)**
   - Refer to the installation instructions in section 4.2 below
4. **Commission the panel**
   - Refer to section 4.2.3

4. Installation

CAUTION: Do not use high voltage test equipment, such as a MEGGER, when the panel or other equipment is connected to the field wiring, as this will cause damage to the panel.

Prior to commencing installation of the control panel, ensure that adequate precautions are taken to prevent damage to the sensitive electronic components on the control board due to electrostatic discharge. You should discharge any static electricity you may have accumulated by touching a convenient earthed object. You should repeat the process at regular intervals during the installation process, especially if you are required to walk over carpets.

The control panel must be installed by suitably qualified technicians familiar with the installation of fire detection systems. In addition, it is recommended to refer to the following information:

- Current edition of 'IEE Wiring Regulations (BS7671)'.
- Current edition of BS5839-1, or local equivalent.
- Any field device installation instructions.

4.1 Electrical Safety

WARNING: *Read this section completely before commencing installation.*

Danger: This panel contains power supply equipment which is powered by 230VAC mains supply

Warning: The power supply uses hazardous voltages. The unit is fitted with a protective cage to protect service engineers from electrical shock. DO NOT OPEN. The power supply has no user serviceable parts.

To prevent overheating, the ventilation holes in the cage must not be obscured.

Notes:

The electrical rating information for the panel is located on the display overlay and is visible when the front cover is removed.

The mains supply cable should be a minimum of 1mm^2 copper protected by a 5A fuse.

An appropriate lockable double pole disconnect device shall be provided as part of the installation. This device must have a minimum contact gap of 3mm. The cover must be coloured red and labelled 'FIRE ALARM: DO NOT SWITCH OFF'.

The panel must be located in a clean, dry area not exposed to vibration, physical shock or risk of damage which complies with the environmental specification detailed in the DUO-CEL Application Guide and should be at least 2 metres away from pager systems or any other radio transmitting equipment. The operating temperature range is -5ºC to +40ºC; maximum humidity is 95%, non-condensing.

DO NOT use mobile phones or other transmitting equipment within 2 metres of the panel.

IMPORTANT NOTES ON BATTERIES:

DANGER: *Batteries are electrically live at all times, take great care never to short circuit the battery terminals.*

WARNING: *Batteries are often heavy; take great care when lifting and transporting batteries. For weights above 24 kilos, lifting aids should be used.*

DANGER: *Do NOT attempt to remove the battery lid or tamper with the internal workings of the battery. Electrolyte is a highly corrosive substance, and presents significant danger to yourself and to anything else it touches. In case of accidental skin or eye contact, flush the affected area with plenty of clean, fresh water and seek immediate medical attention.*

Valve Regulated Lead Acid (VRLA) batteries are "low maintenance", requiring no electrolyte top-up or measurement of specific gravity.

WARNING: *Only clean the battery case with a cloth that has been soaked or dampened with distilled water. Do not use organic solvents (such as petrol, paint thinner, benzene or mineral spirits) or other materials that can substantially weaken the case. Do not use a dry cloth as this will generate static electricity, which in turn may lead to an explosion.*

WARNING: *Avoid operating temperatures outside the range of -15°C/5°F to +50°C/122°F for float/standby applications.*

The recommended normal operating temperature is 20°C.

HIGH TEMPERATURE will reduce battery service life. In extreme cases this can cause Thermal Runaway, resulting in high oxygen/hydrogen gas production and battery swelling. Batteries are irrecoverable from this condition and should be replaced.

LOW TEMPERATURE will prolong battery life but reduce output capacity.

DANGER: *Do not incinerate batteries. If placed in a fire, the batteries may rupture, with the potential to release hazardous gases and electrolyte. VRLA batteries contain substances harmful to the environment.*

Exhausted batteries must be recycled. Return them to the battery manufacturer or take them to your Council waste disposal site for appropriate disposal.

PANEL ELECTRICAL SAFETY:

The volt-free relay contacts provided within the panel must not be used to directly switch any voltage that exceeds 30V. (Please also refer to relay rating data).

All installation work should be carried out in accordance with the recommendations of the current edition of the IEE regulations by suitably qualified and trained personnel.

THIS PANEL MUST BE EARTHED

4.2 Pre-installation Checks

1. Carefully remove the control panel from the packing and lay the panel on a suitable flat surface.
2. Undo the three screws holding the front cover to the back box (one at the top, two at the bottom).
3. Remove the front cover and return it to the packing box.
4. Locate the spares bag and check that the following items are present.
   a) Set of battery leads (1 each of Red, Black & Blue)
   b) Plastic keys for control panel control access (2-off).
   c) Rubber bung for Keyswitch.
   d) 10uF capacitors (or composite zone EOL devices for twin-wire panels), 1 for each zone. These may already be fitted in the panel terminals.
   e) Up to six 10k resistors (1 for Fire Signal output EOL, 1 for Remote Input EOL, 4 for Alarm EOL dependant on number of alarm circuits)
   f) 1 each of 2k2, 220R, 1k, 4k7 and 470R resistors for the Remote Input Switches.
   g) 1 Terminal cover-plate for the power supply unit.
   h) 1 Cable Tie for holding the mains cable
   i) 1 blank insert for zone text
   j) 1 Battery Fuse, 2A fast blow 20mm glass.
   k) 1 Battery clamp (may already be fitted in panel)

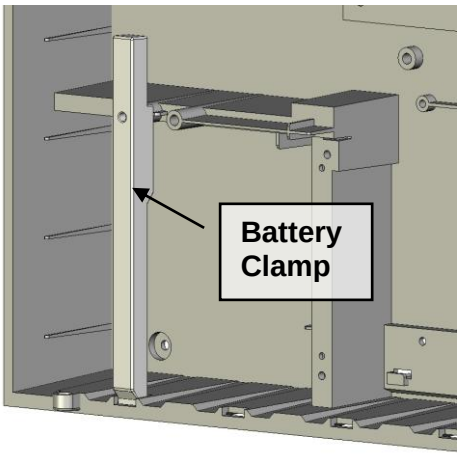
   All items, except for the battery fuse, will be required for the installation of the panel.

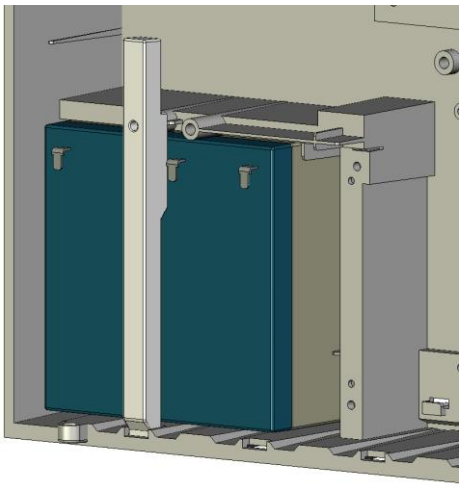
4.2.1 DUO-CEL Panel Installation Instructions

The front cover should have been removed as detailed above in the pre-installation checks. The front cover is not required during installation and commissioning, so leave it safely stored in the original packing box.

1. Remove the control board complete with cover as follows:
   a. Disconnect the two power leads at the left-hand side of the control board.
   b. Undo the two screws at the top of the control board and remove the control board complete with the cover. Place the control board & cover inside the original packing box for safety.
   c. The two screws can be re-inserted into the threaded bushes for convenience.

   The power supply should not be removed.
2. Identify the indented holes in the back of the enclosure that are used to mount the enclosure.
3. Determine the best location for the enclosure. This should be dust & moisture free, not subject to mechanical vibration or shock. The panel should be mounted at least 2 metres away from any radio transmitting equipment such as pager systems and other wireless equipment.
4. Position the enclosure against the wall and mark the location of the keyhole at the top-centre on the back box.
5. Drill and loosely fix the enclosure using suitable fixings (not supplied).
6. Level the enclosure and mark the four fixing holes at each corner of the back box.
7. Drill and firmly fix the enclosure to the wall.
8. Remove the battery clamp which is held in by one screw (if fitted).





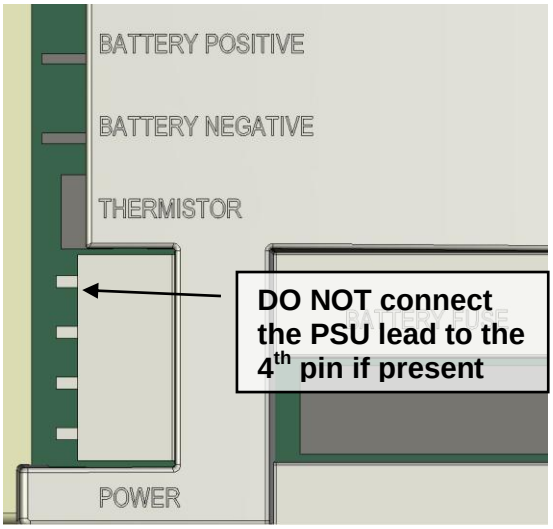
9. Insert the two 3.4Ah Powersonic batteries, positioning them with the spade terminals at the top.
10. Fix the battery clamp back into position to firmly hold the batteries.
11. Attach the black battery lead to the black spade terminal on the right-hand battery. **Do not connect any other battery leads**.

NOTE: Only use the battery leads supplied, with insulated connectors.

12. Fix the control board (with PCB cover) back into the enclosure, bringing the leads from the power supply unit underneath the control board and over the right-hand battery. Ensure that the earth lead is correctly attached to the control board by the left-hand screw.

    Connect the leads to the Sounder Expansion board if fitted.

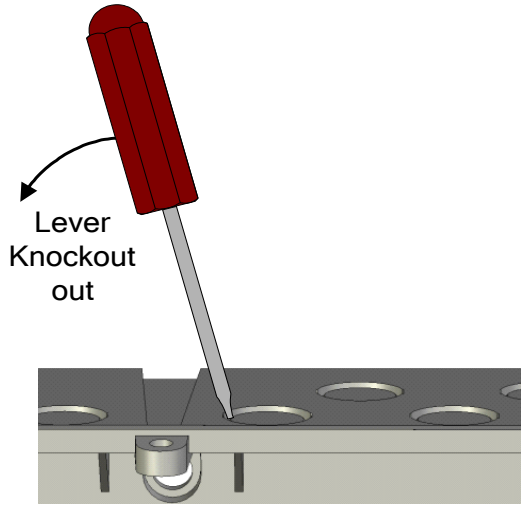
13. Connect the power supply leads to the control board.



14. Connect the black battery lead to the BATTERY NEGATIVE spade terminal on the control board.

15. Determine the number of cable entry holes required and remove the necessary knockouts from the top of the enclosure. These knockouts can be removed by inserting a flat-bladed screwdriver into the slot on the rim of the knockout and gently levering the knockout out.

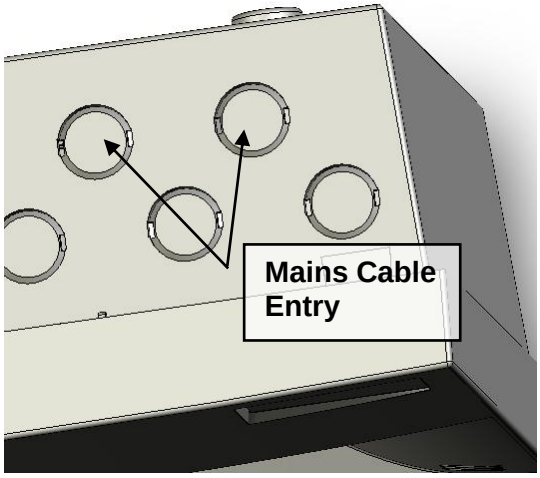
    WARNING: The knockouts are designed to be removed with ease. Excessive force may damage the enclosure.



NOTE: The knockout cannot be re-inserted once removed.

16. Gland the wring into the enclosure using 20mm cable glands. Do not connect the cables to the control panel at this stage.

    The Mains cable should be glanded via one of the cable-entries shown below:



NOTES

An appropriate lockable double pole disconnect device shall be provided as part of the building installation. This must be labelled 'FIRE ALARM. DO NOT SWITCH OFF'. This device must have a minimum contact gap of 3mm.

The mains supply must be via a dedicated circuit exclusive to the panel. The mains supply to the panel must be protected by a 5A fuse.

Use only mains cable compliant to BS6004, BS6500, or equivalent, within the following limits:

	Cable Diameter	Conductor Diameter
Minimum	**4.0mm**	**1.0mm (0.8mm^2)**
Maximum	**8.0mm**	**2.25mm (4.0mm^2)**

17. Connect the incoming mains cable to the power supply, leaving the earth core 3cm longer than the live & neutral cores. (If the mains cable gets pulled out of the power supply, the safety earth will be the last core to be disconnected). See Figure 12.
18. Use the supplied cable tie to fix the mains cable to the enclosure via the plastic loop. See Figure 12.
19. Insert the plastic cover-plate (supplied in the spares bag) into the two holes in the top of the terminal block of the power supply. This is to prevent unintentional access to the live mains cable connections during installation and commissioning.
20. Connect all incoming cable screens or drain wires to the Earth bar or Earth stud as fitted. Ensure that the electrical continuity of any cable screen is maintained through to the last device on the circuit.
21. Ensure all 12 DIL switches on the panel are OFF.
22. Connect the Zone EOL devices as follows:

    I. **Standard Panel Factory Default mode:**

    Connect a 10uF capacitor across each of the zone terminals. Observe correct polarity.

    II. **Standard Panel EOL resistor mode:**

    Connect a suitable resistor (3k9 to 6k8) across each of the zone terminals. Set DIL switch RESISTOR EOL to the ON position.

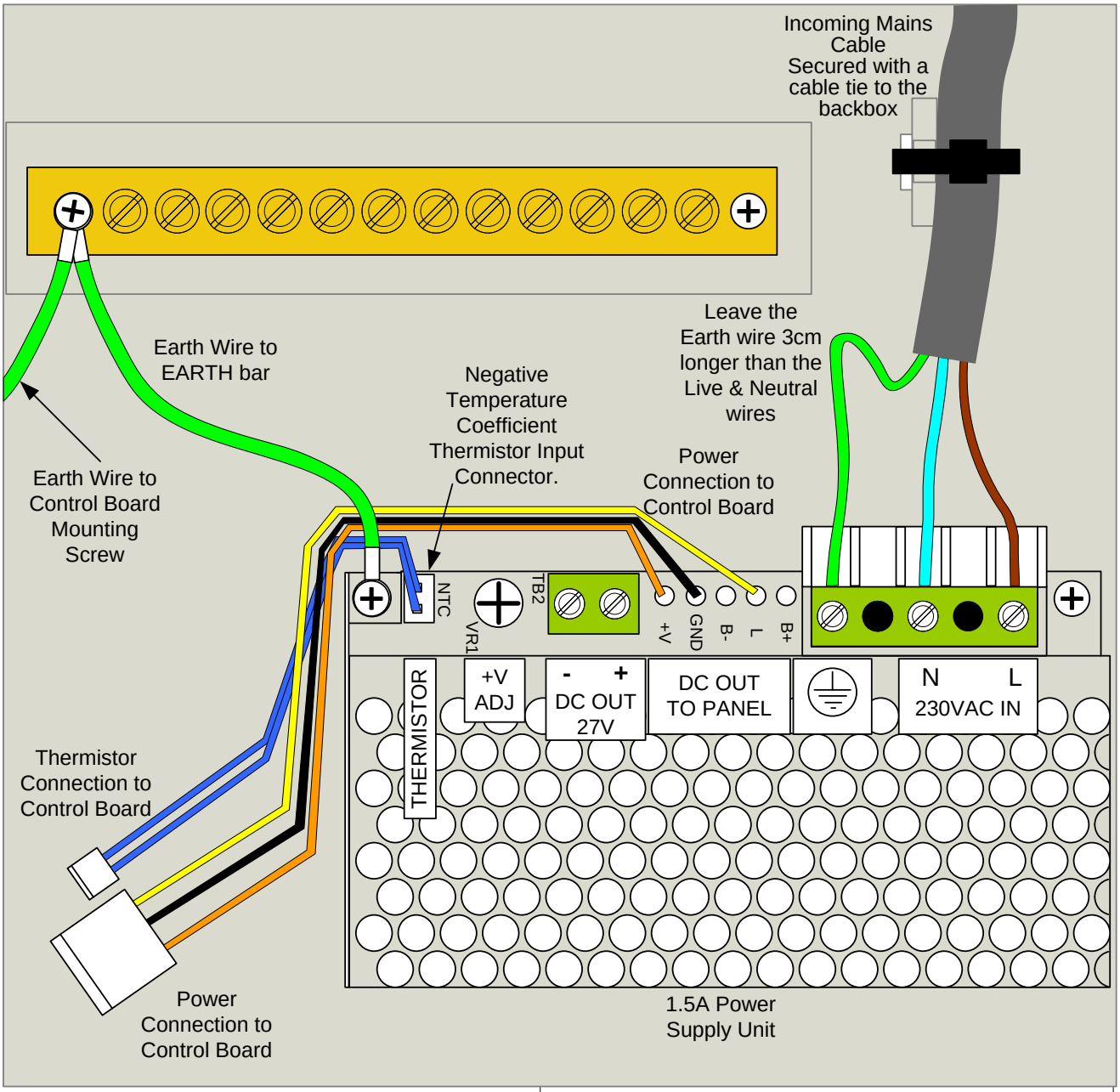
    III. **Twin-Wire Panel:**

    Connect the twin-wire EOL (see Figure 5) across each of the zone terminals, observing correct polarity.
23. Connect a 10k resistor across the Fire Signal terminals.
24. Connect a 10k resistor across the Remote Input terminals.
25. Connect a 10k resistor across each of the Alarm circuit terminals.
26. If repeaters are required, they should be connected and commissioned **after** the panel has been commissioned. See section 7.6.

4.2.2 Battery removal & Replacement

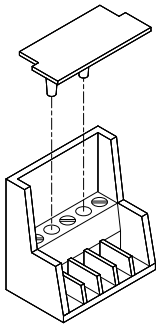
Please refer to the **FIRE**CLASS DUO-CEL logbook for details on how and when to replace the standby batteries.

Figure 12 – BAQ35T24 1.5A Power Supply Connections



NOTE: The black wire may be connected to (B-) instead of (GND) on the PSU. This is quite normal and does not affect the operation of the PSU in any way.

COVER PLATE (SUPPLIED IN THE SPARES KIT) TO BE MOUNTED INTO THE TWO EMPTY SCREW HOLES IN THE PSU TERMINAL BLOCK



4.2.3 DUO-CEL Repeater Installation Instructions

The Repeater installation is generally the same as the panel installation. Follow section 4.2.1 up to and including step 20. For DC powered repeaters, the steps involving batteries and mains wiring can be ignored.

There are two DIL switches on the repeater control board, labelled **NUM REP A** & **NUM REP B**. They should be set as follows:

Repeater No.	NUM REP A	NUM REP B
0 (Disabled)	OFF	OFF
1	ON	OFF
2	OFF	ON
3	ON	ON

Gland the wiring into the repeaters but do not connect the wires into the terminals at this stage. Details of the wiring connections are shown in Figure 11.

Do not power up the mains powered repeaters at this stage.

5. Panel Commissioning

5.1 Introduction

The following equipment should be available where possible to minimise commissioning time:

i) VHF/UHF Portable Radio or other communication device (for two engineers)

ii) Digital Multi-meter with accurate voltage & resistance measuring capabilities

5.2 Commissioning Checklist

1. Before commissioning, the engineer should check the following:
   i) All field wiring has been inspected and tested in accordance with manufacturer's wiring recommendations and all relevant local regulations.
   ii) All field cables are wired into the control panel enclosure through suitable cable glands.
   iii) Detector bases are terminated but detector heads are not fitted. Any devices with electronic components are not fitted. Terminations to devices with electronic components should be linked through to maintain cable continuity.
   iv) Manual Call Points are not connected but cable is linked through to maintain continuity.
   v) No end-of-line devices (e.g. alarm circuit EOL resistors) are fitted in the field.
2. The following information should be available to the commissioning team:
   i) Detection layout drawings.
   ii) Wiring schematic diagram.
   iii) Control Panel installation manuals.
   iv) Installation manuals for all equipment connected to the system.
   v) Site-specific configuration details.

Tracing wiring faults on long circuits that are routed through risers etc. can be difficult without knowledge of the wiring route.

It is therefore recommended that the electrical installer is available on site until basic wiring continuity is proven.

5.3 An Overview of the Commissioning Procedure

Commissioning is broken in to 3 sections:

i) Pre-commissioning wiring check.

ii) Powering the panel up with no field wiring connected, configuring the panel in accordance with the site-specific requirements and carrying out a functional check.

iii) Functional testing of all circuits and field devices to check each circuit and function in turn to ensure correct operation of the entire system.

In this way any faults may be located quickly and accurately. The general procedures are as follows:

- Alarm circuits should be checked first by using the Evacuate function. The correct operation of each sounder should be checked to ensure that audibility levels meet the relevant regulations.
- Detection zones should be commissioned next. The purpose is to establish the correct functioning of each device and check for correct indication at the control panel. The panel responses [as configured] should be checked at this time.
- All ancillary inputs and outputs should be commissioned and the functionality confirmed.

WARNING: Before testing, the engineer must be aware both of the operation of all devices fitted to the auxiliary circuits and of the consequences of their operation.

5.4 Pre-Commissioning Wiring Check

NOTE: This pre-commissioning wiring check procedure should be followed to test all wiring prior to specific commissioning of any detection, alarm and auxiliary circuits.

1. Ensure that no devices are connected to the detection zones and alarm circuits, but that the cables are linked through at the device locations to achieve a continuous circuit.

2. Ensure that the resistance of all cables to earth and between cores is at least 2MΩ.

   Check the following:

   i) Positive to earth resistance is 2MΩ or greater.

   ii) Negative to earth resistance is 2MΩ or greater.

   iii) Positive to negative resistance is 2MΩ or greater.

3. Connect a wire link as the end-of-line device on each of the zones and alarm circuits. At the panel end, measure the resistance across the positive & negative ends of the cables for each of the circuits; ensuring the value does not exceed 20Ω for alarm circuits and 7.2Ω for twin-wire zone circuits (detection-only zone circuits can be up to 20Ω). Remember to remove the wire links after the tests.

   Maintain correct polarity throughout all circuits. Check and rectify any faults.

4. All sounders, detector heads and call points should now be connected. Remember to remove any links fitted to detector bases. Be very careful to maintain correct polarity at each device

   NOTE: For twin-wire circuits, ensure that all detector heads are fitted. On power-up, the panel will determine the zone quiescent condition and monitor for head removal below this point, so if a detector base (or sounder base) is empty it must be linked through for correct monitoring.

5.5 Powering up

Prior to powering up, the panel will have been installed in accordance with the installation instructions, all cabling will have been fully installed and tested, glanded into the panel enclosure but not connected to the panel terminals. The mains supply should be isolated externally to the panel.

1. Final battery connections:

   a. Connect the blue battery lead across the red & black battery terminals either side of the battery clamp.

   b. Connect the red battery lead to the BATTERY POSITIVE spade terminal on the control board.

   c. DO NOT connect the other end of the red battery lead to the battery at this stage.

2. Once the permit to energise the mains supply is in place, energise the mains at the external isolator switch.

   The panel should switch on, illuminating the SUPPLY ON LED and flashing the PSU FAULT LED. The internal buzzer should pulse.

3. Connect the red battery lead to the red battery terminal of the left-most battery.

   After a short period (less than 60 seconds) the internal buzzer should silence and the PSU FAULT LED should extinguish.

   The only indication should be the SUPPLY ON LED.

   This is referred to as the quiescent condition of the panel.

   If any other indications are present, identify the affected circuit and rectify the fault (incorrect or missing EOL, EOL wrong polarity, battery fuse blown, DIL switches incorrectly set etc).

4. With no panel access key inserted, press the Test button. The panel should respond by illuminating all indications and sounding the buzzer. This will continue for 5 seconds after the button is released.

5.6 Panel Configuration.

5.6.1 Basic Default Configuration

When first powered up, the DUO-CEL panel can be operated in the factory default configuration:

- All zones latching fire.
- 10uF Capacitor EOL (unless selected to RESISTOR EOL during the installation procedure), or composite EOL for twin-wire panels
- Sounders – General steady Alarm mode selected (not zonal, not pulsed).
- No zones programmed for dependency.
- No repeaters configured
- Earth fault monitoring – enabled [link fitted].
- Buzzer – enabled.

5.6.2 Site-Specific Configuration

It is possible to tailor the functionality of the DUO-CEL fire alarm panel in line with site-specific requirements. Details of the site configurable options and the configuration process are provided in section 6 below. The actual configuration can be recorded in the panel log book. This configuration is not lost when the panel is powered down.

6. Operating the Engineer's functions

The Engineer's configuration facilities are controlled by DIL switches located on the motherboard, accessed by removing the front cover of the panel. Each configuration feature has its own dedicated DIL switch. The DIL switches are as follows:

1: Z1 NON LATCH
2: RESISTOR EOL
3: ALERT MODE
4: DEPEND CONF
5: ZONAL ALARMS
6: S/C FIRE
7: AUX. RESET
8: DISABLE BUZ
9: REP CONFIG (4 & 8 zone only)
10: SNDR EXPAND (not used)

Most functions simply require the appropriate DIL switch to be either ON or OFF. Switches 2 & 10 are not used on the Twin-Wire panel and must be set to the OFF position.

6.1 Zone Dependency (coincidence)

One or more zones can be programmed to dependency mode.

If a fire condition occurs on a dependency zone, the panel will not immediately indicate the alarm. A 30-minute counter will be started and the zone will be reset to clear the detector. After the zone power is reinstated, if a fire detector or manual call point is operated within 30 minutes, the panel will raise the alarm condition.

If no detectors or MCPs are operated before the 30-minute timer ends, the zone will return to coincidence detection (i.e. a detector alarm on the zone will start the 30-minute timer again).

Operation of MCPs will always raise a fire alarm immediately (unless the MCP is an Alert MCP).

A fire condition on any zone not configured for dependency will always raise a fire alarm immediately.

6.1.1 Zone Dependency selection

When the zone dependency configuration DIL switch (DIL switch 4 – Depend Conf) is switched to the ON position, the panel sounds the internal buzzer and illuminates the SYSTEM FAULT LED to indicate that the programming mode has been initiated. The current status of the zones is also displayed on the zone fault LEDs; LED OFF – No Dependency, LED ON – zone configured for dependency.

Operation of the select button will then switch the Select cursor on, flashing at the zone 1 fault LED.

Pressing the Select button again will move the flashing cursor to the next zone. The cursor will be switched off after the last zone (1, 2 4 or 8, depending on the panel) or if no buttons are pressed for 30 seconds.

Note that in the Dependency Configuration mode, any faults, tests or disablements are masked and are not shown on the display. The panel will not respond to faults or fires.

With the cursor flashing on the required zone, pressing the Disable button toggles the state of the Dependency mode for that zone.

Once all required zones have been configured and the configuration DIL switch is returned to the OFF position, the panel will return to normal operation.

The programming information is stored in EEPROM and is not lost during power-down of the panel.

6.2 Repeater Configuration

The panel can be programmed to communicate with up to 3 repeaters. Repeaters can only be used with 4-zone & 8-zone panels.

6.2.1 Repeater selection

When the Repeater configuration DIL switch (Rep Config) is switched to the ON position, the panel sounds the internal buzzer and illuminates the SYSTEM FAULT LED to indicate that the programming mode has been initiated. The current status of the repeater configuration is also displayed on the Repeater Fault LEDs, which are visible when the front cover is removed.

Operation of the Select button will increment the number of repeaters, up to a maximum of 3, after which the number is reset to zero.

Number of Repeaters	REP1 FLT LED	REP2 FLT LED	REP3 FLT LED
0	OFF	OFF	OFF
1	ON	OFF	OFF
2	ON	ON	OFF
3	ON	ON	ON

Once the required quantity of repeaters has been configured and the configuration DIL switch is returned to the OFF position, the panel will return to normal operation.

The programming information is stored in EEPROM and is not lost during power-down of the panel.

NOTE: Do not connect & configure repeaters until the panel has been commissioned.

6.3 Invalid Configuration conditions:

An invalid programming condition will exist if both DIL switch 4 & 9 are in the ON position at the same time. In this case:

- The System Fault LED will flash.
- The fault relay will operate.
- The panel buzzer will sound.
- The Cursor indication will clear.
- Configuration will be inhibited.

To clear the invalid condition, return both DIL switch 4 & 9 to the OFF position.

6.4 Zone 1 Non-latch operation

The Zone 1 non-latch DIL switch allows zone 1 to be set to non-latching fire indication.

In this mode a fire condition on zone 1 operates the sounders but not the Auxiliary Fire Relay. The alarm indication automatically clears when the fire condition is removed from zone 1, without the need to manually reset the panel.

6.5 Resistor EOL

The Resistor EOL DIL switch configures all zones to monitor an end-of-line resistor (6k8 to 3k9) instead of the default 10uF capacitor.

Ensure no detector bases have diodes fitted if using this mode.

NOTE: This facility is not available on the twin-wire panel.

Resistor EOL monitoring is provided for older installations where it is impractical to change the EOL resistor for a capacitor.

Detector/MCP discrimination will not work when the zone monitoring is configured for Resistor EOL and therefore zone alarm dependency (coincidence detection) and Alert Mode will not work correctly.

6.6 Alert Mode

The Alert Mode DIL switch configures all zones to discriminate between detector alarms and MCP alarms. Detector Alarms are treated as Alert; MCP alarms are treated as Evacuate.

The Sounders are pulsed (1 second on, 1 second off) during the Alert alarm and operate continuously during the Evacuate alarm.

When used in conjunction with Zonal Sounder operation, a detector alarm will only pulse the relevant zonal sounder circuit with all other sounder circuits silent. A MCP alarm will operate the relevant zonal sounder circuit continuously and pulse all other sounder circuits.

On the display, the left zonal fire LED operates for detector alarms, the right zonal fire LED operates for MCP alarms.

NOTE:

It is recommended that TYCO CP211 call points are used on zones with Twin-Wire sounders in order to reduce the zone load when more than one call point is operated. You can use call points with 360R resistor fitted as an alternative but operation of more than one call point will increase the zone load and may prevent the Twin-Wire sounders from operating correctly.

If Twin-Wire sounders are not being used then the TYCO CP211 or MCP with resistor may be used (MCP resistor needs to be 220R to 360R). Manual call points with 470R to 1k will be indicated as a detector alarm instead of a MCP alarm.

Alert mode will not work correctly with Resistor EOL due to the inability to correctly discriminate between detectors and MCPs when EOL resistors are used.

6.7 Selectable Zonal or General Alarm Sounder operation

The Zonal Alarms DIL switch allows the sounder circuits to operate zonally in line with the alarm zone. The actual operation of the alarm circuits will vary depending on the type of zone detection and number of zones available on the panel.

Twin-wire panel (1 to 8 zones):

All twin-wire sounders operate zonally, sounder circuits on the motherboard operate as general alarms (i.e. all four alarm circuits on the motherboard operate for any zone fire)

Standard panel, 1 to 4 zone panels:

Sounder circuits 1 to 4 operate individually for a fire condition on the respective zone. 1 and 2-zone panels have 2 sounder circuits).

Standard panel, 8-zone panel:

Sounder circuits 1 to 4 operate as general alarms (i.e. all four alarm circuits on the motherboard operate for any zone fire).

6.8 Buzzer Disable

The Disable Buz DIL switch allows the panel buzzer and Buzzer Active output to be disabled so that they do not operate for alarms or faults. The panel buzzer will still operate for button presses.

The panel does not give any indication that the buzzer has been disabled. This feature is provided for use during panel commissioning and maintenance only. Ensure that the DIL switch is returned to the OFF position after commissioning/maintenance tests are complete.

6.9 Earth Fault monitoring.

The DUO-CEL panel is designed to monitor for low impedance faults to earth on the field cables. Earth faults can lead to false alarms or failure to operate the sounders or other outputs.

For installations where earth fault monitoring is unsuitable, it can be disabled by removal of the insulated jumper link. The link can be placed just on one pin rather than across both pins**.**

Earth Fault monitoring should be disabled only after all field cabling has been tested and confirmed to be free from faults.

7. Commissioning the Panel

After completion of the pre-commissioning wiring check, power-up and configuration steps, commission the circuits in line with the following guide.

NOTE:
Operation of the panel buttons requires the Access key to be inserted and rotated to the vertical position.

7.1 General Alarm Circuits

1. Remove the resistor from the first alarm circuit terminal and connect the first alarm circuit wiring to the terminals, observing correct polarity. The panel will indicate SOUNDER FAULT.
2. Place the EOL resistor across the terminals of the last sounder on the circuit. Check that the sounder fault indication clears.
3. Use the Alarm Test facility [see DUO-CEL User Manual] or press the Evacuate button to operate the sounders. Check that all sounders connected to the alarm circuit operate.
4. Clear the Alarms Test condition or press SILENCE/RESOUND ALARMS as required. All sounders should be silent.
5. Repeat steps 1 to 4 for any remaining alarm circuits.

7.2 Detection zones

Work logically and systematically through each zone. All devices on each zone must be tested and verified to be working correctly.

7.2.1 Zone Fault Indications

1. Remove the EOL from the zone 1 terminals and connect the cables of the zone 1 circuit to the panel terminals, observing the correct polarity. The panel will indicate a zone fault for zone 1. The panel will also indicate a sounder fault if set to twin-wire mode.
2. Place the EOL across the last device on zone 1, observing correct polarity. Check that any zone 1 fault (and sounder fault if twin-wire) indications clear after a few seconds. For twin-wire panels, the panel should be powered down and then powered up again to set the correct quiescent threshold.
3. Check the fault monitoring of the cable is correct by applying an open circuit then a short circuit at the EOL device. Check that the fault condition is indicated on the correct zone at the fire panel.
4. Restore the zone circuit to the healthy condition and confirm that the fault indication clears.

Repeat steps 1 to 4 for all additional zones.

7.2.2 Zone Fire Indications

1. On each zone in turn, start with the device nearest the panel and operate each manual call point and detection device on the zone.
2. After operation of each device confirm:
   a. The fire indication is provided on the panel on the correct zone.
   b. The fire alarm devices operate correctly in line with the panel configuration.
   c. The Fire Signal output and Fire Relay operate.
3. Press the Silence Alarms and the Reset buttons after each device test and check the alarm clears (Manual Call Points must be manually reset before resetting the panel).

Detector removal operation:

1. Starting at the panel, remove the 1st detector along the zone cable on zone 1 and check that:
   - The yellow zone fault LED illuminates.
   - The Sounder Fault LED and General Fault LED operate
   - The internal buzzer sounds.
   - The fault relay operates.
2. If the zone has diodes fitted to detector bases, operate a manual call point further along the cable and check that the panel registers an alarm condition. Reset the MCP and then the panel.
3. Refit the detector and check that the control panel returns to the normal state.
4. Repeat steps 1 to 4 for each detector on the zone.
5. If the panel is a twin-wire panel then press the EVACUATE button and check that all sounders on the zone operate. Press the SILENCE ALARMS button to stop the sounders.

Any faults that are found must be traced and rectified before proceeding.

Repeat steps 1 to 5, one zone at a time, until all the zones are commissioned.

7.3 Remote Control Input

1. Remove the 10k resistor from the Remote Control Input circuit terminals and connect the field wiring to the terminals. The panel will indicate a Remote Control Fault.
2. Place the 10k resistor across the ends of the field wiring. Check that the fault indication clears.
3. Place a short circuit across the 10k EOL resistor and check that the panel indicates a Remote Control Fault. Remove the S/C from the EOL and check that the fault indication clears.
4. Activate the Class Change switch or timer and check that all sounders operate for 5 seconds

and then are silent. Deactivate the Class Change switch or timer.

5. Activate the Alert switch. Check that all sounders pulse and the ALERT/EVAC ON LED on the panel illuminates. Deactivate the Alert switch. Check that the sounders are silent and the panel indication clears.
6. Activate the Evacuate switch. Check that all sounders operate and the ALERT/EVAC ON LED on the panel illuminates. Deactivate the Evacuate switch. Check that the sounders are silent and the panel indication clears.
7. Press the EVACUATE button on the panel and check that all sounders operate. Activate the Remote Silence Alarms switch and check that all sounders silence. Deactivate the Remote Silence Alarms switch.
8. Activate a detector on any zone and check that the panel indicates the alarm. Activate the Remote Reset switch and check that the panel clears the alarm indication. Deactivate the Remote Reset Switch.

Any faults should be traced and rectified before proceeding.

7.4 Fire Signal Output

1. Remove the 10K resistor from the Fire Signal Output circuit terminals and connect the field wiring to the terminals, observing correct polarity. Check that any fault indications clear after a few seconds (the relay at routing equipment should have been connected as shown in Figure 1).
2. To operate the output, initiate a fire condition on a zone. Check that the panel illuminates the Fire Signal On LED and that the fire signal is received at the receiving station. Silence and reset the fire alarm panel to clear the output.
3. Place a short circuit across the cables at the routing equipment and check that the panel indicates a Fire Signal Fault.
4. Remove the S/C and check that the fault indication clears.

7.5 Ancillary outputs

1. Connect the field cabling into the Remote Output terminals (DIS., EVAC., BUZ.).
2. The correct operation of equipment connected to the Disablement Active output should be verified by disabling/enabling a zone (see the User Manual for details).
3. The correct operation of equipment connected to the Evacuate Active output should be verified by pressing the EVACUATE button on the panel.
4. The correct operation of equipment connected to the Buzzer Active output should be verified by disconnecting one battery lead to create a PSU Fault indication (may take up to 60 seconds), the internal buzzer & BUZ. Output will pulse. Reconnect the battery lead after the test.

7.6 Repeaters

Repeaters can be connected once all other circuits have been commissioned. Repeaters should be connected one at a time to make fault-finding easier. Ensure the repeaters have been correctly configured as described in section 4.2.3.

1. At the first repeater, only connect the wiring from the panel into the terminals on the repeater as shown in Figure 11. DO NOT connect the wiring for the 2nd & 3rd repeater.
2. At the panel, connect the repeater wiring into the terminals as shown in Figure 11.
3. If the repeater is being powered from the panel, then the repeater will power up as soon as the power cables are connected into the terminals at the panel.

   The repeater will indicate a COMMUNICATION FAULT and sound the buzzer.
4. If the repeater has a separate power supply then connect the red battery lead to the batteries and energise the mains power to the repeater.

   The repeater will indicate a COMMUNICATION FAULT and sound the buzzer.
5. Configure the panel to communicate with one repeater as detailed in section 6.2.

   After a few seconds, the Communication Fault at the repeater should clear and both the panel & repeater should be in the quiescent state.

   If the panel or repeater shows a fault then trace and clear the fault before proceeding.
6. At the second repeater, only connect the wiring from the first repeater into the terminals on the repeater. DO NOT connect the wiring for the 3rd repeater.
7. At the first repeater, connect the second repeater wiring into the terminals.
8. If the repeater is being powered from the panel, then the repeater will power up as soon as the power cables are connected into the terminals at the first repeater.

   The second repeater will indicate a COMMUNICATION FAULT and sound the buzzer.
9. If the repeater has a separate power supply then connect the red battery lead to the batteries and energise the mains power to the repeater.

   The second repeater will indicate a COMMUNICATION FAULT and sound the buzzer.

10. Configure the panel to communicate with two repeaters as detailed in section 6.2.

    After a few seconds, the Communication Fault at the second repeater should clear and the panel & repeaters should be in the quiescent state.

    If the panel or either repeater shows a fault then trace and clear the fault before proceeding.
11. At the third repeater, connect the wiring from the second repeater into the terminals on the repeater.
12. At the second repeater, connect the third repeater wiring into the terminals.
13. If the repeater is being powered from the panel, then the repeater will power up as soon as the power cables are connected into the terminals at the second repeater.

    The third repeater will indicate a COMMUNICATION FAULT and sound the buzzer.
14. If the repeater has a separate power supply then connect the red battery lead to the batteries and energise the mains power to the repeater.

    The third repeater will indicate a COMMUNICATION FAULT and sound the buzzer.
15. Configure the panel to communicate with three repeaters as detailed in section 6.2.

    After a few seconds, the Communication Fault at the third repeater should clear and the panel & repeaters should be in the quiescent state.

    If the panel or any repeater shows a fault then trace and clear the fault before proceeding.

7.6.1 Repeater Testing

Repeat the following tests at each repeater to ensure each repeater is working correctly.

1. With the ACCESS key removed press the TEST button and check that all LEDs illuminate and the buzzer sounds.
2. Turn the Access key to the vertical position and press the EVACUATE button. Check that all sounders operate. At each repeater, check that the ALERT/EVAC ON LED illuminates and the internal buzzer operates.
3. Press the SILENCE BUZZER button on the repeater. Check that the internal buzzer silences on all repeaters.
4. Press the SILENCE ALARMS button on the repeater. Check that the sounders silence.
5. Operate a Manual Call Point or detector on each zone in turn. Check that all repeaters indicate the alarm.
6. Reset the MCPs and press the RESET button on the repeater. Check that the panel and repeaters return to the quiescent state.
7. Set the first repeater address to 0. Check that the panel illuminates the REPEATER FAULT & FLT REP 1 LEDs. Check that any additional repeaters display a steady COMMUNICATION FAULT LED.
8. Set the first repeater address back to 1 and check that the panel and repeaters return to normal.
9. Set the second repeater address to 0. Check that the panel illuminates the REPEATER FAULT & FLT REP 2 LEDs. Check that any additional repeaters display a steady COMMUNICATION FAULT LED.
10. Set the second repeater address back to 2 and check that the panel and repeaters return to normal.
11. Set the third repeater address to 0. Check that the panel illuminates the REPEATER FAULT & FLT REP 3 LEDs. Check that any additional repeaters display a steady COMMUNICATION FAULT LED.
12. Set the third repeater address back to 3 and check that the panel and repeaters return to normal.

7.7 Power Supply Unit.

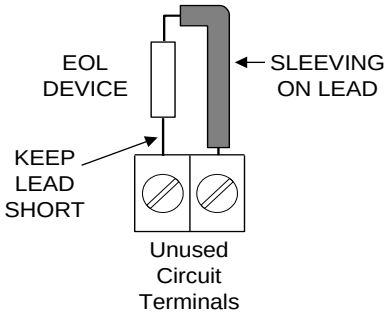
1. Ensure that the system is fully commissioned with all output circuits loaded as required by the system design.
2. Ensure that the batteries have been on charge for at least 2 hours.
3. Isolate the primary power supply feed to the panel.
4. Check the panel and repeaters indicate power supply fault.
5. Operate the EVACUATE button to load the panel.
6. Confirm that the system continues to function correctly.
7. Press the SILENCE ALARMS button and restore the primary supply. Check that the panel & repeaters return to the quiescent state.

Repeat the above steps for any mains powered repeaters.

7.8 Final Dressing of the Cables

Ensure that the field conductors are secure and tidy inside the enclosure. Check that all cables are firmly held in the terminal blocks & Earth bar. Check that the Earth Bar is firmly fixed to the enclosure. Check that all Earth leads are correctly & firmly connected. Check that End-Of-Line devices in unused circuits are positioned in a safe manner and are unlikely to create short circuit faults due to movement. It is advised that unused EOL devices

have insulating sleeving placed on the leads for safety.



7.9 Site Configuration

Once the panel and repeaters have been installed and tested for basic operation, any site-specific settings can be applied via the DIL switches.

Each of the selected options should be tested to ensure the panel operates as required.

Record all settings in the log book for future reference.

8. System Handover

Once the panel and repeaters have been installed and fully tested in accordance with the site specific requirements, the front cover of the enclosure can be attached to the panel and repeaters.

The ACCESS keys should be removed from the panel and repeaters and handed over to the site's designated Responsible Person.

Note: In order to comply strictly with the requirements of EN54-4:1998 Clause 6.2.1 (Power Supply Equipment Enclosure shall meet at least classification IP30 of EN 60529:1991), the Keyswitch hole must be blocked when not in use, by inserting the rubber bung supplied. This is because the hole is greater than 2.5mm in diameter.

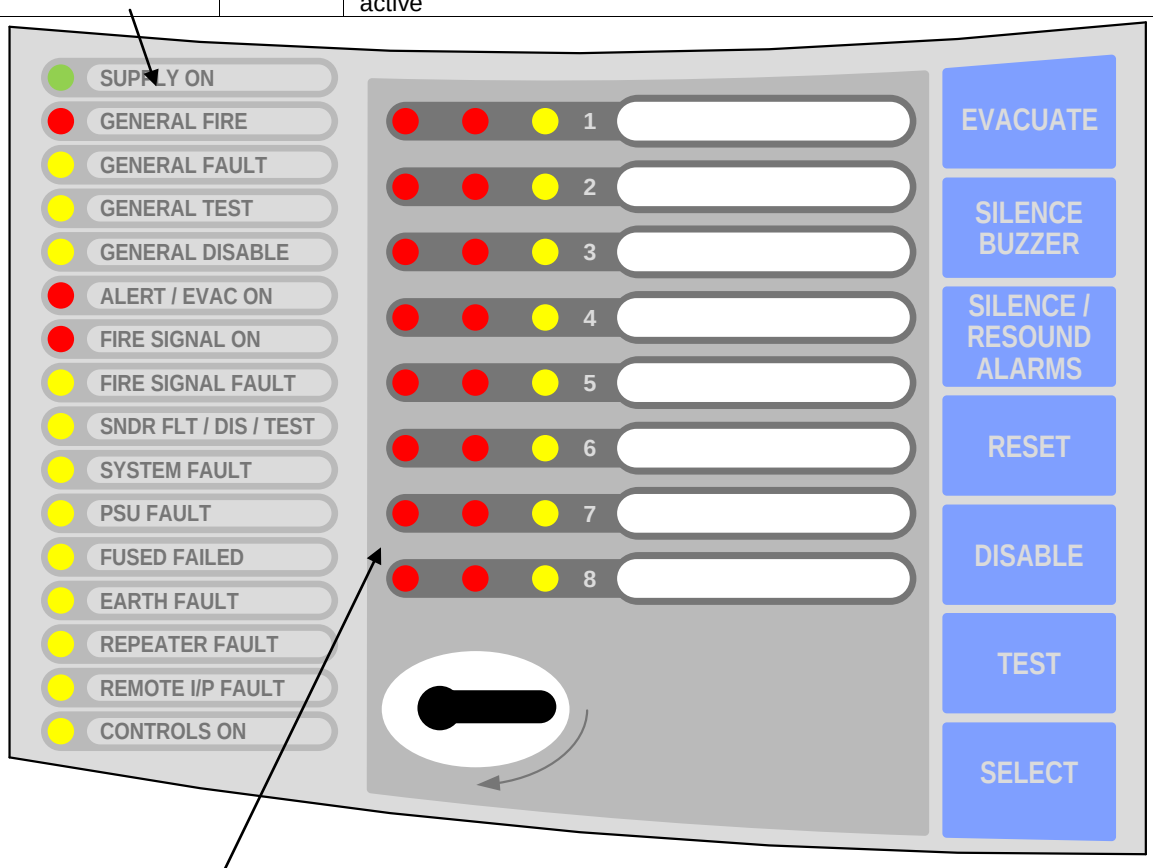
All authorised users must be given adequate instruction and training in the operation of the system.

9. System Maintenance

System maintenance details can be found in the logbook.

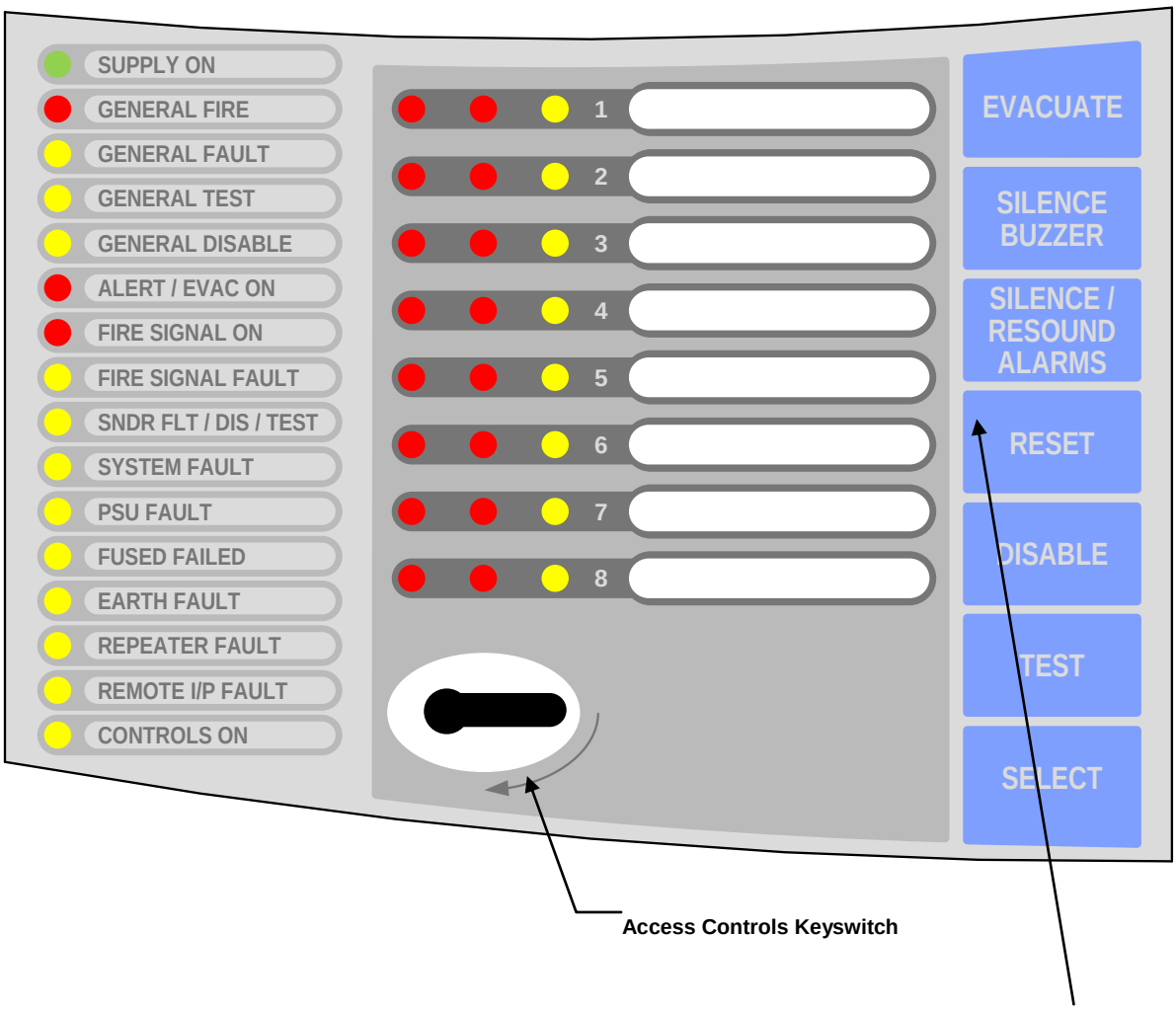
10. User Indications

General Indicator Section		
Indicator	**Colour**	**Operating Condition**
Supply On	Green	**OFF**: No mains or battery power, **ON**: Panel has power (battery and/or mains)
General Fire	Red	**OFF**: Quiescent, **FLASH**: New Alarm Condition, **ON**: Alarm Accepted
General Fault	Yellow	**OFF**: No faults present, **FLASH**: One or more faults present
General Test	Yellow	**OFF**: No circuits in Test, **ON**: One or more circuits in Test
General Disablement	Yellow	**OFF**: No circuits Disabled, **ON**: One or more circuits Disabled
Alert/Evac On	Red	**OFF**: No Alert or Evacuate, **FLASH**: Remote Alert/Evacuate active. **ON**: Panel Evacuate active
Fire Signal On	Red	**OFF**: Fire Signal output not active, **ON**: Fire Signal output active
Fire Signal Flt / Dis / Tst	Yellow	**OFF**: No fault on Fire Signal output, **FLASH**: Fault on Fire Signal output, **ON**: Fire Signal output Disabled or in Test
Sounder Flt / Dis / Tst	Yellow	**OFF**: No Fault on Sounder circuits, **FLASH**: Fault on one or more Sounder circuits, **ON**: Sounder circuits Disabled or in Test
System Fault	Yellow	**OFF**: System is working correctly, **ON**: System is in the SAFE state (Microcontroller failed or EEPROM data corrupted)
PSU Fault	Yellow	**OFF** power supply is healthy, **FLASH**: PSU fault and/or battery fault
Fuse Failed	Yellow	**OFF**: Auxiliary 24Vdc output available, **FLASH**: Electronic Fuse on Auxiliary 24Vdc output activated
Earth Fault	Yellow	**OFF**: No cable faults to Earth, **FLASH**: One or more cable faults to Earth
Repeater Fault	Yellow	**OFF**: No Repeater faults, **FLASH**: One or more Repeater faults
Remote Control Fault	Yellow	**OFF**: No faults on Remote Control input, **FLASH**: Fault on Remote Control input
Controls On	Yellow	**OFF**: User Controls disabled, **ON**: User Controls enabled, **FLASH**: Select mode active



Zone Location Indications		
Indicator	**Colour**	**Operating Condition**
User Zone Location Text	Red	**OFF**: No Alarm on zone, **FLASH**: New Alarm on zone, **ON**: Alarm accepted on zone. NOTE: With Detector/MCP discrimination, the left LED is for MCPs, the right LED for Detectors.
User Zone Location Text	Yellow	**OFF**: No Fault on zone circuit, **FLASH**: Fault on zone circuit, **ON**: Zone circuit Disabled or in Test

11. User Controls

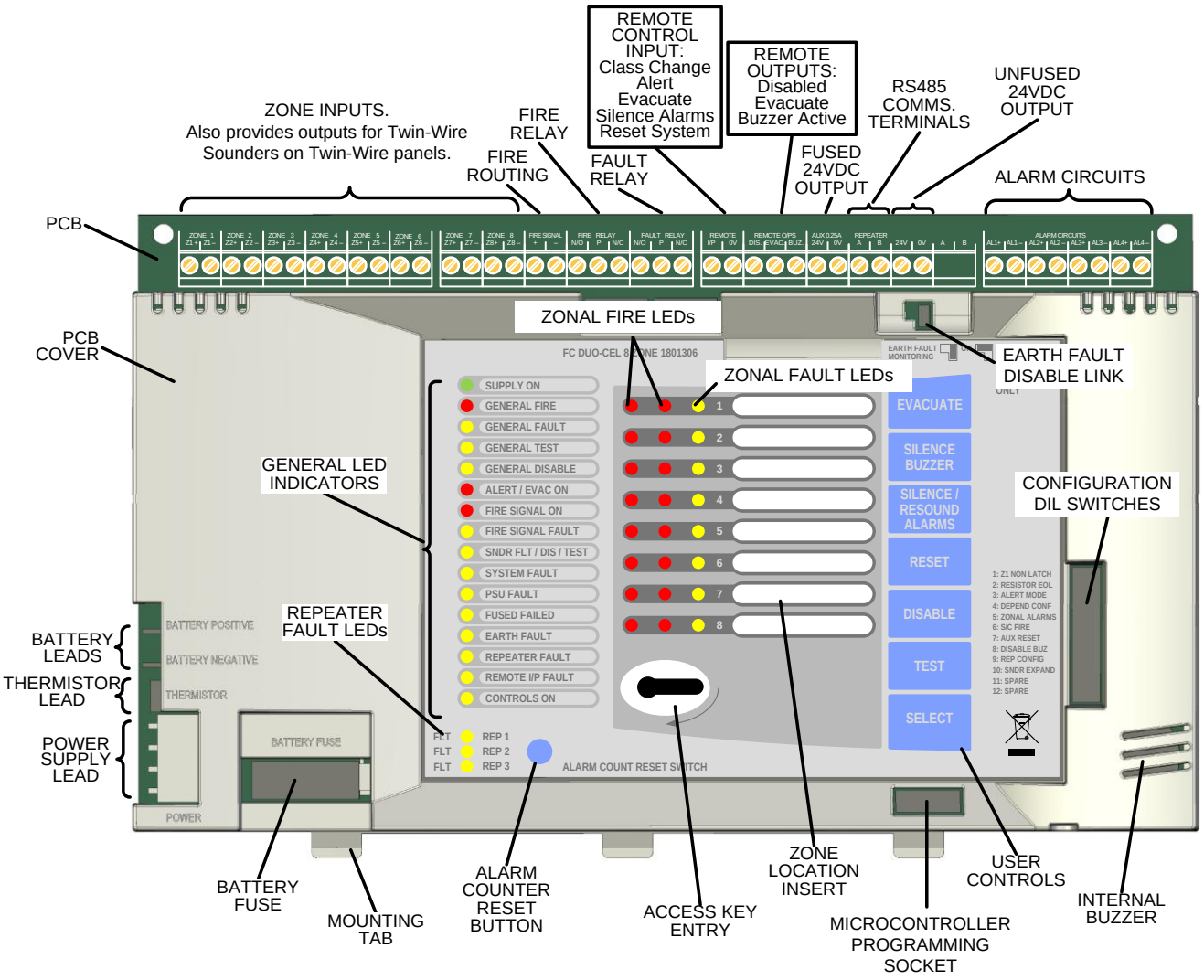


Switch	Functionality	Button Availability
Evacuate	Operates all sounders continuously and illuminates the Alert/Evac On LED until the Silence/Resound Alarms button is operated	When controls are unlocked.
Silence Buzzer	Silences the internal buzzer on the Panel & Repeaters.	When controls are locked or unlocked
Silence/Resound Alarms	When any sounders are active, press to silence sounders. Press again to resound the silenced sounders.	When controls are unlocked
Reset	Press to clear any fault & alarm conditions and return the panel to the quiescent state	When controls are unlocked
Disable	Displays Alarm Counter	When controls are locked
	Illuminates only the currently disabled circuits	When controls are unlocked
	Toggles the selected circuit between Disabled & Enabled states.	When controls are unlocked and in circuit select mode
Test	Press to illuminate all LEDs and sound the buzzer for 5 seconds.	When controls are locked
	Illuminates only the circuits currently in test	When controls are unlocked
	Toggles the selected circuit between Test & Normal states.	When controls are unlocked and in circuit select mode
Select	First operation enables the circuit select mode; subsequent operations move the flashing cursor through the available circuits until the last circuit, then exits the circuit select mode.	When controls are unlocked

12. PCB Layouts

Figure 13 illustrates the control board for the DUO-CEL 8-zone panel with the PCB cover fitted.

Figure 13 – Panel control board and PCB cover

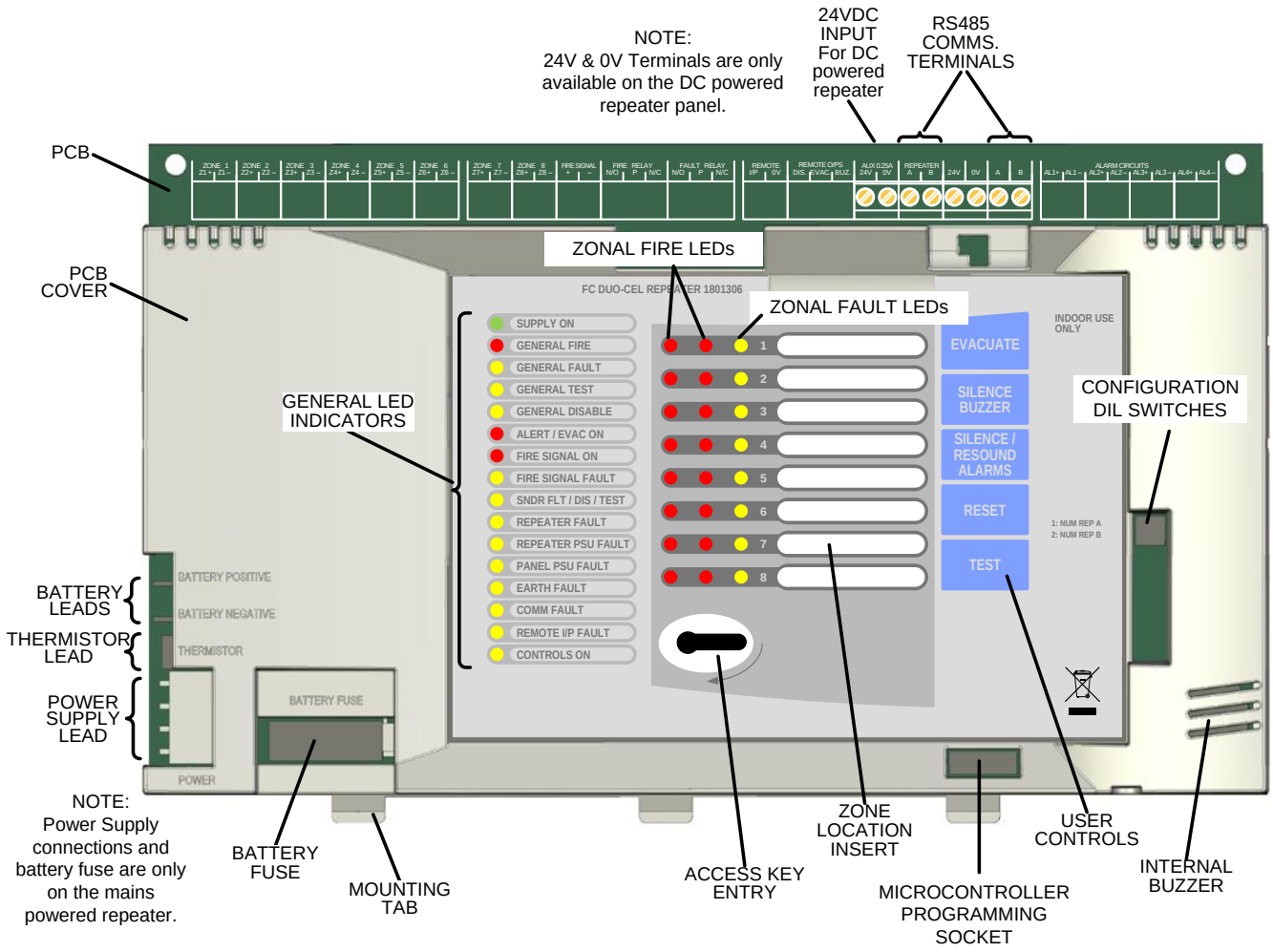


Note:

The Microcontroller programming socket is for use during manufacturing only and should not have any links fitted across any of the pins. Improper use of the connector may result in permanent damage to the control board.

Figure 14 illustrates the control board for the DUO-CEL repeater with the PCB cover fitted.

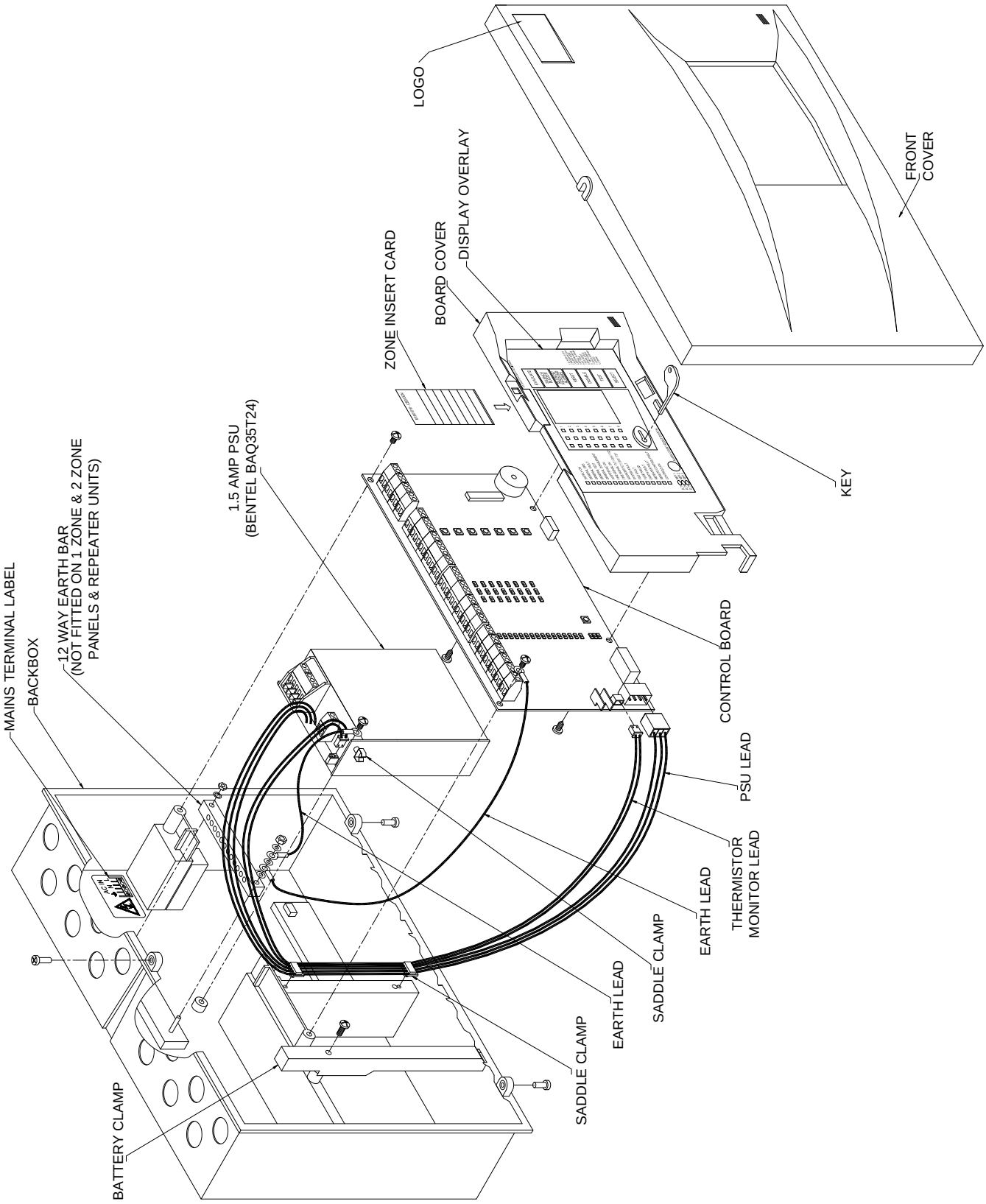
Figure 14 – Repeater control board and PCB cover



Note:

The Microcontroller programming socket is for use during manufacturing only and should not have any links fitted across any of the pins. Improper use of the connector may result in permanent damage to the control board.

13. General Assembly Drawing



14. Alarm Count Display

The Alarm count can be displayed by pressing the DISABLE button with the controls locked. The count is displayed on the general LED indicators as a binary count starting on the General Fire LED and going down to the PSU Fault LED. The values for each LED illuminated can be added up to give the total count, which can be from 0 to 1023. The count can be reset at any time by pressing the Alarm Count Reset button, which is only accessible when the front cover is removed.

NOTE: The Alarm Count Reset function is only accessible at access level 4, i.e. this function should only be operated by persons trained and authorized by the manufacturer either to repair the CIE (control & indicating equipment), or to alter its firmware, thereby changing its basic mode of operation.

Figure 15 – Alarm Count LED assignment